

REMARKS

Present Status of the Application

The Office Action rejected all presently-pending claims 1-12. Specifically, the Office Action rejected claims 1-12 under 35 U.S.C. 103(a), as being unpatentable over applicant's admitted prior art in view of Miyashita et al. (U.S. Patent 6,115,084). Applicant has amended independent claims 1 and 7, and canceled claim 8. Applicant has also amended specification for correcting typographic error. After entry of foregoing amendments, claims 1-7 and 9-12 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Summary of Applicant's Invention

The Applicant's invention is directed to an LCD driving circuit. The LCD driving circuit includes a digital gamma-correction and inversion circuit, a digital-to-analog conversion means, and an LCD timing control circuit. The digital gamma-correction and inversion circuit is coupled to directly receive a digitized video signal from a display memory, for performing a digital gamma-correction process on the digitized video signal and then performing a polarity inversion process on selected lines of the gamma corrected video signal. The digital-to-analog conversion means is coupled to the digital gamma-correction and inversion circuit, for converting the digital output of said digital gamma-correction and inversion circuit into analog form. The LCD timing control circuit is directly coupled to an external time control circuit, the digital gamma-correction and inversion circuit, and the digital conversion means, to directly receive a plurality of video control signals associated with the digitized video signal, for converting the video control signals into an LCD timing control signal to control the display of

the digitized video signal on the LCD.

Discussion of Office Action Rejections under 35 U.S.C. 103(a)

The Office action rejected claims 1-12 under 35 U.S.C. 103(a), as being unpatentable over applicant's admitted prior art (AAPA) in view of Miyashita et al.. Applicant has amended independent 1 and 7 to improve clarity. Applicant has also cancel claim 8 to avoid double patenting. Applicant respectfully traverses the rejections for at least the reasons set forth below.

Comparing FIG. 1 of AAPA with FIG. 2 of the present invention, it is clearly different for the circuit structure and its operation mechanism between FIG. 1 and FIG. 2. In FIG. 1 of AAPA, the composite video signal Cvideo that is an analog signal. The signal Cvideo then is inputted to the video decode 111, so as to decouple into an analog video signal and the synchronizing control signals. The analog RGB signal is corrected by the analog gamma correction circuit. The synchronizing control signal are processed by the LCD timing control circuit 121 and PLL circuit 122. Since the signal Cvideo is composed first and further by analog manner and then is decoupled again. It loses fidelity. Moreover, the analog gamma correction cannot precisely correct the RGB signal. The drawbacks are discussed in specification on Pages. 5 and 6.

On the contrary, the present invention as shown in FIG. 2, has been directly transferred to the digital RGB signal to the digital gamma correction and inversion circuit 221 for the image correction. The timing control signals are also directly inputted to the LCD timing control circuit. The unexpected results over AAPA are discussed on pages 11 and 12 under the operation

of driving circuit of the present invention. The features have been recited in amended independent claim 1 as follows:

1. An LCD driving circuit for driving an LCD to display a video image, comprising:

a digital gamma-correction and inversion circuit, coupled to directly receive a digitized video signal from a display memory, for performing a digital gamma-correction process on the digitized video signal and then performing a polarity inversion process on selected lines of the gamma corrected video signal;

a digital-to-analog conversion means, coupled to said digital gamma-correction and inversion circuit, for converting the digital output of said digital gamma-correction and inversion circuit into analog form; and

an LCD timing control circuit, coupled to an external time control circuit, said digital gamma-correction and inversion circuit, and said digital conversion means, to directly receive a plurality of video control signals associated with the digitized video signal, for converting the video control signals into an LCD timing control signal to control the display of the digitized video signal on the LCD; and

a PWM and shutdown circuit for supplying power to the LCD and shutting down the LCD when the LCD has been idle for a preset period.

(Emphasis added.) Likewise, independent claim 7 also recites the features as follows:

7. An LCD driving circuit for driving an LCD to display a video image, comprising:

a digital gamma-correction and inversion circuit, coupled to directly receive a digitized video signal from a display memory, for performing a digital gamma-correction process on the digitized video signal and then performing a polarity inversion process on selected lines of the gamma corrected video signal;

a digital-to-analog conversion means, coupled to said digital gamma-correction and inversion circuit, for converting the digital output of said digital gamma-correction and inversion circuit into analog form; and

an LCD timing control circuit, coupled to an external time control circuit, said digital gamma-correction and inversion circuit, and said digital conversion means, to directly receive a plurality of video control signals associated with the digitized video signal, for converting the video control signals into an LCD timing control signal to control the display of the digitized video signal on the LCD.

(*Emphasis added.*) The features emphasized in independent claim 1 and 7 have not be disclose by AAPA.

For the foregoing reasons, the present invention clearly distinguished over AAPA.

The Office Action further cites Miyashita et al. in combination to supply the missing feature in AAPA. Miyashita et al. disclosed that there two types of gamma correction: analog gamma correction and digital gamma correction. However, Miyashita et al. still fail to specifically teach how to amend the LCD driving circuit of AAPA (see FIG. 1) into the present invention, such as the circuit in FIG. 2. A simple replacement of analog gamma correction circuit into a digital gamma correction circuit (an ADC and DAC may also be included) is not equal to the circuit of the present invention.

Therefore, AAPA in view of Miyashita et al. failed to disclose the present invention. Prior art references Dingwall (U.S. 6,046,719) and Asari et al. (U.S. 5,644,329) also failed to disclose the LCD driving circuit of the present invention, considering as a whole.

For at least the foregoing reasons, Applicant respectfully submits that independent claims 1 and patently define over AAPA and the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-6 and 9-12 patently define over the prior art reference as well.

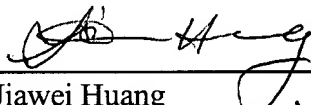
CONCLUSION

For at least the foregoing reasons, it is believed that all pending claims 1-7 and 9-12 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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**ANNOTATED VERSION OF MODIFIED CLAIMS
TO SHOW CHANGES MADE**

In The Specification

On page 9, line 13, please change "101" to --201--.

In the claims

1. (Once Amended) An LCD driving circuit for driving an LCD to display a video image, comprising:

a digital gamma-correction and inversion circuit, coupled to directly receive a digitized video signal from a display memory, for performing a digital gamma-correction process on the digitized video signal and then performing a polarity inversion process on selected lines of the gamma corrected video signal;

a digital-to-analog conversion means, coupled to said digital gamma-correction and inversion circuit, for converting the digital output of said digital gamma-correction and inversion circuit into analog form; and

an LCD timing control circuit, coupled to an external time control circuit, said digital gamma-correction and inversion circuit, and said digital conversion means, to directly receive a plurality of video control signals associated with the digitized video signal, for converting the video control signals into an LCD timing control signal to control the display of the digitized video signal on the LCD; and

a PWM and shutdown circuit for supplying power to the LCD and shutting down the

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LCD when the LCD has been idle for a preset period.

7. (Once Amended) An LCD driving circuit for driving an LCD to display a video image, comprising:

a digital gamma-correction and inversion circuit, coupled to directly receive a digitized video signal from a display memory, for performing a digital gamma-correction process on the digitized video signal and then performing a polarity inversion process on selected lines of the gamma corrected video signal;

a digital-to-analog conversion means, coupled to said digital gamma-correction and inversion circuit, for converting the digital output of said digital gamma-correction and inversion circuit into analog form; and

an LCD timing control circuit, coupled to an external time control circuit, said digital gamma-correction and inversion circuit, and said digital conversion means, to directly receive a plurality of video control signals associated with the digitized video signal, for converting the video control signals into an LCD timing control signal to control the display of the digitized video signal on the LCD.

Please cancel claim 8 without prejudice and disclaimer.